NEW JERSEY 2002 INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT [305(B) AND 303(D)].

A Report on the Water Quality In New Jersey Pursuant to The New Jersey Water Quality Planning Act, and Sections 305(b) and 303(d) of the Federal Clean Water Act

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The mission of the New Jersey Department of Environmental Protection is to assist the residents of New Jersey in preserving, sustaining, protecting and enhancing the environment to ensure the integration of high environmental quality, public health and economic vitality

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NEW JERSEY 2002 INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT [305(B) AND 303(D)].

PART I: INTRODUCTION

Genesis of the Integrated List

Water Quality Inventory Report [305(b) Report]

The Federal Clean Water Act (Act) mandates states to biennially report to the US Environmental Protection Agency (USEPA) on the water quality of their waters as per their support of designated uses and attainment of water quality standards. This report is called the *Water Quality Inventory Report* or the 305(b) Report, named from the section of the Act mandating it. The report contains assessments of water quality and descriptions of water resources management programs. These 305(b) reports are used by Congress and USEPA to establish program priorities and funding for federal and state water resources management programs.

List of Water Quality Limited Waters [303(d) List]

The Act also requires states to biennially provide USEPA with a list of waterbodies for which required technology-based effluent limits are not stringent enough to achieve the state's surface water quality standards. This list is termed the *List of Water Quality Limited Waters* or the 303(d) List, again based upon its corresponding section of the Act. This regulation requires the identification of impaired waterbodies: those waters for which technology-based pollution controls were not stringent enough to achieve the state's surface water quality standards. The state is required to establish TMDLs for these impaired waterbodies based on a priority ranking. Impaired Waterbodies Lists must be based on a documented methodology that includes an evaluation of existing and readily available data. Waterbodies continue to be included on subsequent Impaired Waterbodies Lists until:

1. TMDLs are completed; or
2. Applicable criteria are met; or
3. The original basis for the listing is shown to be flawed.

Integrated Water Quality Monitoring and Assessment Report

The close association between the two reporting requirements is evident in that the 305(b) report presents the water quality status of all waters of the state while the 303(d) list represents a subset of these waters that statutorily require a TMDL. Additionally, both efforts utilize shared data sets. None the less, until 2002, the 305(b) reports and 303(d) lists for New Jersey were issued as separate products. In 2000 USEPA encouraged states to integrate the two into a single product which would be termed an *Integrated Water Quality Monitoring and Assessment Report*. This combined report presents the extent to which waters of the State are attaining water quality standards (the 305(b) portion of the effort) and identifies waters that are impaired and need TMDLs as required under section 303(d) of the Act. The report also identifies waters that are being removed from the 303(d) List because they are attaining water quality standards.

The Integrated Report provides water resources managers and citizens with information regarding the following:

- Delineation of water quality assessment units providing geographic display of assessment results;
- Progress toward achieving comprehensive assessment of all waters;
- Water quality standards attainment status;
- Methods used to assess water quality standards attainment status;
- Additional monitoring needs and schedules;
- Pollutants and waterbodies requiring Total Maximum Daily Loads (TMDLs);
- Management strategies (including TMDLs) under development to attain water quality standards.

Sublists

The Integrated List consists of five categories or lists (New Jersey terms them sublists). All assessed waterbodies are placed on the sublists based upon: 1) the degree of support of designated uses; 2) how much is known about the waterway's water quality status; and 3) the type of impairment preventing use support. Based on USEPA's assessment and listing methodology (USEPA, 2001; USEPA, 2002.), each waterway should be placed in only one of the five unique assessment sublists. Each sublist is described below as per EPA's guidance:

Sublist 1. Attaining the water quality standard and no use is threatened (threatened defined as currently supporting uses but information suggests that uses will not be met within the next two years). Waterways are listed in this sublist if there are data and information that meet the requirements of the state's assessment and listing methodology and support a determination that the water quality standard is attained and no use is threatened.

Sublist 2. Attaining some of the designated uses; no use is threatened; and insufficient or no data and information is available to determine if the remaining uses are attained or threatened. Waterways are listed in this sublist if there are data and information which meet the requirements of the state's assessment and listing methodology to support a determination that some, but not all, uses are attained and none are threatened. Attainment status of the remaining uses is unknown because there is insufficient or no data or information.

Sublist 3. Insufficient or no data and information to determine if any designated use is attained. Waterways are listed in this sublist where the data or information to support an attainment determination for any use is not available, consistent with the requirements of the state's assessment and listing methodology. To assess the attainment status of these waterways, the state should obtain supplementary data and information, or schedule monitoring as needed.

Sublist 4. Impaired or threatened for one or more designated uses but does not require the development of a TMDL.

4A. TMDL has been completed. Waterways are listed in this sublist once all TMDL(s) have been developed and approved by EPA that, when implemented, are expected to result in full attainment of the standard. Where more than one pollutant is associated with the impairment of a waterway, the water will remain in Sublist 5 until all TMDLs for each pollutant have been completed and approved by EPA.

4B. Other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future. Consistent with the regulation under 130.7(b)(i), (ii), and (iii), waterways are listed in this sublist where other pollution control requirements required by local, state, or federal authority are stringent enough to implement any water quality standard applicable to such waters.

4C. Impairment is not caused by a pollutant. Waterways are listed in this sublist if the impairment is not caused by a pollutant but are instead impaired by factors such as habitat degradation, stream channeling, etc. States and territories should consider scheduling these waterways for monitoring to confirm that there continues to be no pollutant-caused impairment and to support water quality management actions necessary to address the cause(s) of the impairment.

Sublist 5. The water quality standard is not attained. The waterway is impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL. This sublist constitutes the Section 303(d) list of waters impaired or threatened by a pollutant(s) for which one or more TMDL(s) are needed. A waterway should be listed in this sublist if it is determined, in accordance with the state's assessment and listing methodology, that a pollutant has caused, is suspected of causing, or is projected to cause an impairment. Where more than one pollutant is associated with the impairment of a single waterway, the waterway will remain in Sublist 5 until TMDLs for all pollutants have been completed and approved by EPA.

The NJ Department of Environmental Protection (DEP) elected to develop an Integrated Report for New Jersey beginning with the 2002 reporting cycle because this approach offers several improvements over the traditionally separate Water Quality Inventory and Impaired Waterbodies List Reports.

The Integrated Report streamlined water quality reporting since data sources and assessment methods are the same in both CWA reporting requirements. However, these changes have also brought new challenges. For example, under USEPA guidance (USEPA, 2001), recommends that a waterbody be included in only one of the 5 sublists (i.e., the sublist that conveys the highest degree of impairment) as a result of the integrated assessment. Thus, if a waterbody meets all applicable surface water quality standards except fecal coliform, the waterbody would be included only in Sublist 5 - *"Water quality standard is not attained and a TMDL is required"* - until the fecal coliform TMDL is completed, even though all other water quality standards are met. Since this approach may result in an overly negative evaluation of overall water quality and mask those uses for which waterbodies are in full support of, **the Department found it necessary to modify the listing methods and has chosen to develop the Integrated List by**

waterbody/parameter, not just by waterbody. This will enable the Department to present each parameter for each waterbody in the appropriate sublist. This results in the possibility of a waterbody being placed on multiple sublists. This also has resulted in the elimination of sublist 2 since a parameter is placed either on sublist 1 (full attainment) or sublist 3(insufficient data).

The Integrated Report combines the non-regulatory requirements of the Water Quality Inventory Report [305(b) Report] with regulation driven List of Impaired Waterbodies [303(d) List] (i.e., only the latter mandates TMDL development). Successful merging into a single report required a thorough and accurate integration of requirements and procedures. In general, sublist 5 of the Integrated List meets USEPA reporting requirements under Section 303(d) (Impaired Waterbodies), and the remaining sublists document assessments under Section 305(b) (Water Quality Inventory). Therefore, the regulatory requirements (i.e., EPA approval and adoption; public participation, etc.) for 303(d) impaired waterbodies listing only apply to sublist 5 of the Integrated List.

Integrated Water Quality Monitoring and Assessment Methods

The methods used to develop the 2002 Integrated Report (and subsequent Reports) are described in the document entitled *Integrated Water Quality Monitoring and Assessment Methods* (Methods Document) (NJDEP, 2002). The goal of this Methods Document is to provide an objective and scientifically sound waterbody assessment methodology including:

- A description of the data that NJDEP will use to assess attainment of surface water quality standards;
- The quality assurance aspects of the data;
- A detailed description of the methods used to evaluate water quality standards attainment;
- The placement of waterbodies within the five sublists.

This Methods Document is a companion to the 2002 Integrated Report. It was developed with public input and will be an evolving document and will be modified, as appropriate, to accompany subsequent Integrated Reports.

Integrated Report Package

Along with the 2002 Integrated List, there are four other documents that support and explain the development of the Integrated Report. The five components of New Jersey's Integrated Report Package are as follows:

- A front-end report entitled *New Jersey 2002 Integrated Water Quality Monitoring and Assessment Report,* summarizing the contents of the integrated list as it applies to designated use attainment statewide within New Jersey. This is the document you are currently reading.
- The Integrated List itself, comprised of sublists 1-5 and priority ranking (Appendix I).
- A document entitled *Integrated Water Quality Monitoring and Assessment Methods* (Methods Document), detailing DEP's assessment methods as applied to the Integrated List

and discussed above. This represents the "documented methodology" referred to in this introduction.

- A *Comparison Document* indicating where waters previously listed on the 1998 303(d) List currently are listed within the 2002 Integrated List.
- A *Response to Comments Document* containing all DEP responses to public and EPA comments on the Methods Document and Integrated List as mandated by the public process.

The 2002 Integrated List and the Public Process

The Department began developing the 2002 Integrated List in May of 2001 by soliciting water quality data through the New Jersey Register, conducting mass mailings (to permittees, environmental organizations and individuals in academia) and posting requests for information on the NJDEP website. This was followed one year later (May 17, 2002) with a public information session explaining the Integrated List and the assessment methodologies employed in its development. On May 20, the Department officially provided notice to the public via the New Jersey Register on the Integrated Water Quality Monitoring and Assessment Methods and the 2002 Integrated List (Sublists 1-5). The printing of the Public Notice began a 45-day comment period that ended on July 8. A public hearing was held in Trenton on June 21.

Because some amendments were made in the list during the initial comment period, the package was renoticed on August 5 for an additional 30-day comment period closing on September 4. A summary of the public process is listed below.

Summary of the Public Process for the 2002 New Jersey Integrated List

2001	
May 21	Solicitation of water quality related data to support the development of the Integrated List via the New Jersey Register (NJR), mass mailing and NJDEP website
2002	
May 17	Public Information Sessions
May 20	Public Notice of Methods and Integrated List in the NJR and web site followed by a newspaper notice. Beginning of 45-day comment period.
June 21	Public Hearing at DEP in Trenton
July 8	End of Comment Period
August 5	Public Notice of amended proposed 2002 Integrated List of Waterbodies (including a priority ranking of impaired waterbodies and at two-year TMDL schedule) and amended Sections 4.2 and 8 of the Methods Document. Start of 30-day comment period.
September 4	Close of comment period.

Sublist 5 of the 2002 Integrated List (New Jersey's 2002 list of water quality limited waterbodies 303(d))

In accordance with the Federal Clean Water Act, NJDEP prepared New Jersey's 2002 list of water quality limited waterbodies (**sublist 5 of the Integrated List**). This list is required by

section 303(d)(1)(A) of the Federal Clean Water Act, and is a component of the Statewide Water Quality Management Plan, as required by the Water Quality Management Planning Rules at N.J.A.C. 7:15-2.1(a)8ii and 7:15-6. This list is adopted as an amendment to the Statewide Water Quality Management Plan.

Section 303(d) of the Federal Clean Water Act requires states to identify waters that are not attaining water quality standards, despite the implementation of technology based effluent limits. States must prioritize these waters for Total Maximum Daily Loads (TMDL) and are also required to identify those high priority waterbodies for which they anticipate establishing a TMDL in the next two years. New Jersey has fulfilled this requirement by listing all waterbodies on sublist 5 of the Integrated List based on 1) observed or expected violations of water quality criteria and 2) where designated uses are impaired or believed to be impaired but do not necessarily have criteria violations on record. This second category is illustrated by listings based upon macroinvertebrate assessments. The designated use (maintenance, migration and propagation of natural and established biota) is believed to be impaired, however, no specific chemical or physical pollutant violation has been identified.

Sublist 5 supercedes the 1998 303(d) List. The new sublist presents all water quality limited waters, prioritizes waterways with regard to scheduling for TMDLs, and includes waters for which TMDL development is occurring or will occur within two years. As stated previously, waterbodies listed on sublist 5 have confirmed violations of surface water quality standards or are suspected of having designated use impairments. Some waterbodies are listed based upon relatively recent data collection. It is important to note, however, that sublist 5 also contains waterbodies based upon assessment results from as far back as 1989 that are based upon conditions observed in the mid-1980s. Substantial efforts have been made by the Department to assess current status of many of these historical listings, especially those based upon metals. Significant progress has been made and every effort will be made to have future Integrated Lists reflect only current water quality conditions.

New Jersey Water Quality and Designated Use Support Summary

This is a summary of the contents of the *New Jersey 2002 Integrated Water Quality Monitoring and Assessment Report* (Integrated Report) as it applies to designated use attainment statewide. The Integrated Report describes attainment of designated uses specified in New Jersey's Surface Water Quality Standards (SWQS) which includes: aquatic life, recreation, drinking water, fish and shellfish consumption, industrial and agricultural. In addition, ongoing and planned strategies to maintain and improve water quality are described, as well as, recommendations and strategies to improve overall water quality statewide. The status of sites listed on the 1998 303(d) List are updated with their current status on the 2002 Integrated List described.

Companion Water Quality Inventory Reports for neighboring Interstate Waters are prepared by and are available from:

- The Delaware River Basin Commission, PO Box 7360, West Trenton, NJ 08628-0360 [tel. (609) 883-9500]. The Commission assesses the Delaware River and Delaware Bay.
- The Interstate Environmental Commission, 311 West 43rd St, New York, NY 10036 [tel. (212) 582-0380]. The Commission assesses the shared waters of New York – New Jersey

Harbor including the Lower Hudson River, Upper and Lower New York Bay, Kill Van Kull, Arthur Kill, Upper Raritan Bay, Newark Bay. The Commission also assesses waters shared between New York and Connecticut.

Comments and questions regarding this report can be provided to Mr. Kevin Berry at the address below:

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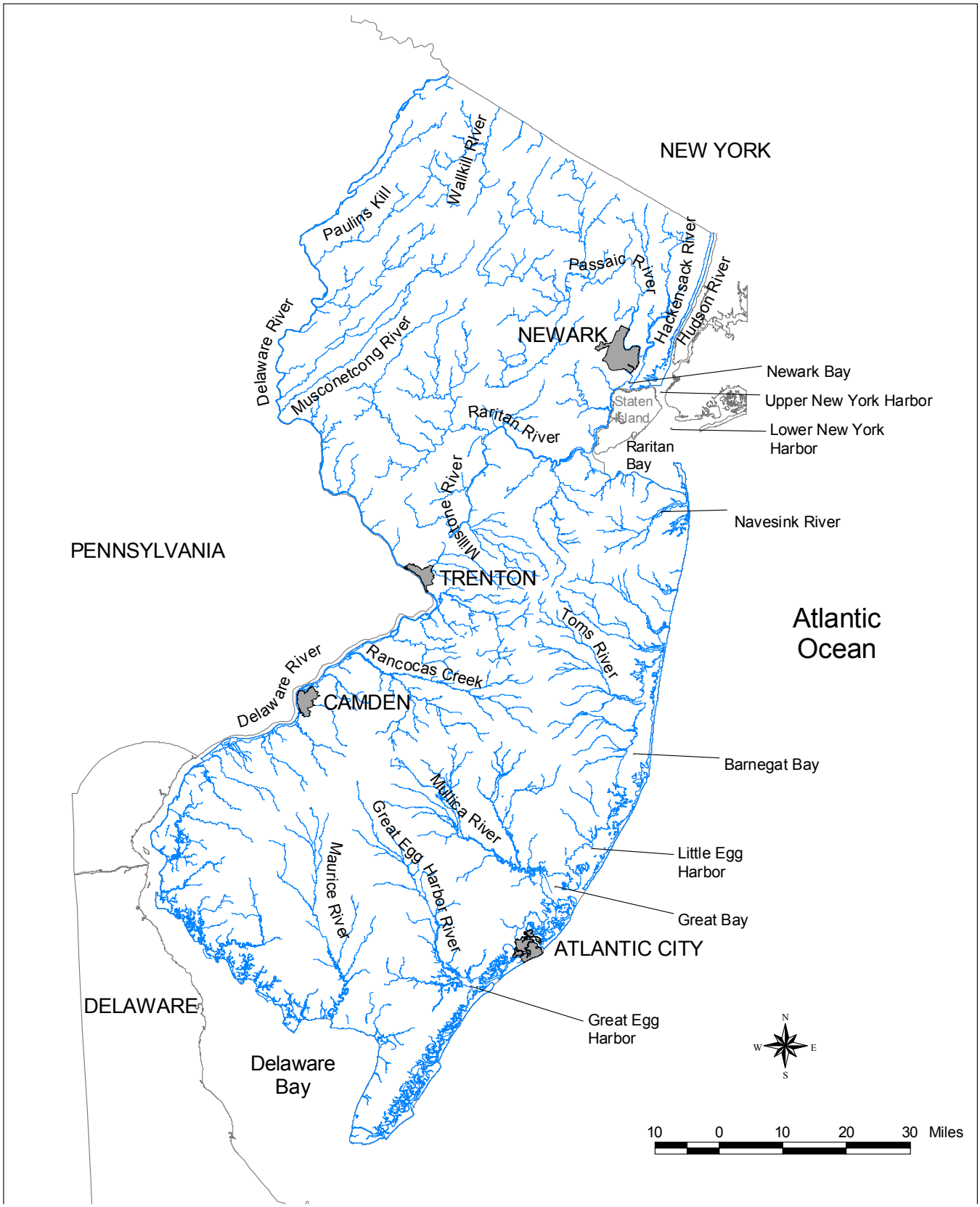
Figure I-1 New Jersey Geography



Data Solicitation

The Department made a concerted attempt to locate and analyze all relevant information in developing the Integrated List. Given the importance and long-term ramifications of a waterbody being placed on the 303(d) list, data which meet the minimum QA/QC requirements must be used. It is the intention of the Department, that through the efforts of providing a detailed Methods Document, that data that meet the QA/QC requirements will be even more readily available in the future.

In preparation for the 2002 Integrated List, the Department solicited data and information from the public for use in developing the List. This was the first time the Department solicited data from the public for this use. Current adopted State and Federal Rules do not require public solicitation of data, however, USEPA is in the process of revising their regulations regarding the development of impaired waterbodies lists to include the solicitation of data as part of the public process. The solicitation was published in the New Jersey Register (NJR), the DEP Bulletin, and on the NJDEP website. A Groupwise Postmaster notice was also used to solicit data from other NJDEP programs. Data were accepted for a period of 6 months.

Quality assurance considerations are particularly important because the adopted sublist 5 of the Integrated List is used to establish priorities for water quality improvement measures, including, TMDL development. Given the importance of sublist 5, the Department must use data which meet the quality assurance requirements outlined in Section 3.

The Department developed the Integrated List using appropriate, readily available data collected by government and non-government entities. In determining which data were appropriate and readily available, the Department considered quality assurance/ quality control, monitoring design, data age, accuracy of sampling location information, data documentation, and use of electronic format for data. It was recommended that a data package should include:

1) A completed QA/QC project plan. It is recognized that some stakeholder water quality data collected to date may not have been collected under a QA/QC project plan "approved" by the Department. This data will be considered, for this solicitation only, which do not have a previously approved QA/QC project plan if the data were collected in accordance with a QA/QC program acceptable to the Department;

2) Data provided in electronic format, preferably STORET. Data may also be provided in Excel, Access, or a compatible format on floppy disc, ZIP drive or CD ROM. Station location data should be provided in ArcView, ArcInfo, or compatible format when possible, or mapped on a USGS Quadrangle Sheet; and,

3) A citable report that includes name address, and telephone number of the entity that generated the data set.

The Department received data from public and private sources as identified in Table 1-1 below. If the data was not used, the rational as to why is noted in the comment column.

Table I-1. Stakeholder Data

Submitted By	**General Location**	**Data Type**	**Parameter**	Comment
Pequannock River Coalition	Pequannock River and tribs.	Water Chemistry	Temperature	Used in Assessment
Hudson County Health Dept.	Hudson River, Newark Bay	Water Chemistry	Fecal Coliform	Used in Assessment
Monmouth County Health Department	Multiple streams within Monmouth County	Water Chemistry and Biological	Fecal Coliform, NH3,Phos., TSS, and pH	Used in Assessment
Interstate Environmental Commission	NY/NJ Harbor Estuary	Water Chemistry	Fecal Coliform; DO	Used in Assessment
Pinelands Commission	Pinelands Area	Water Chemistry	Conventionals	Used in Assessment
Helen Arvin	**Cooper River headwaters**	**Fish Tissue**	**Mercury**	**Department had used this data and issued fish consumption warnings for these private lakes.**
John Kraeuter	**Delaware Bay**	**Biological**	**Oyster Spat count**	**Information not applicable to the Integrated List's assessment methods**
Gregory White	Wanaque River	Water Quality Model	DO, unionized ammoniaT phosp., TDS, CPO, nitrate	Received late. Data are being assessed for next listing cycle as per NJR
PVSC	**Lower Passaic River**	**Water Chemistry**	**DO**	**Incomplete data package. No QA/QC plan. Data similar to other data and would not alter the assessments.**

Executive Summary and Major Findings

Section 305(b) of the **Federal Clean Water Act requires states** to report on the status of water quality in their principal waters in terms of overall water quality and the support of designated uses. States must report on strategies to maintain and improve water quality.

Section 303(d) of the Federal Clean Water Act requires states to identify waters that are not attaining water quality standards, despite the implementation of technology-based effluent limits. States must prioritize these waters for Total Maximum Daily Load (TMDL) analyses. States are also to identify those high priority waterbodies for which they anticipate establishing TMDLs in the next two years.

Beginning with the 2002 reporting cycle, **New Jersey under USEPA's guidance has integrated the reporting requirement of Clean Water Act section 305(b) and section 303(d) into a single product** which is termed an *Integrated Water Quality Monitoring and Assessment Report*. This combined report presents the extent to which waters of the State are attaining water quality standards (the 305(b) portion of the effort) and identifies waters that are impaired and need TMDLs as required under section 303(d) of the Act. The report also identifies waters that are being removed from the 303(d) List because they are attaining water quality standards.

The integrated listing is based upon placing a state's waterbodies into one of five possible categories or lists (New Jersey terms them sublists) based upon 1) the degree of support of designated uses, 2) how much is known about the waterway's water quality status and 3) the type of impairment preventing use support. Each sublist is described below as per EPA's guidance:

Sublist 1. Attaining the water quality standard and no use is **threatened** (threatened defined as currently supporting uses but information suggests that uses will not be met within the next two years).

Sublist 2. Attaining some of the designated uses; no use is threatened; and insufficient or no data and information is available to determine if the remaining uses are attained or threatened.

Sublist 3. Insufficient or no data and information to determine if any designated use is attained.

Sublist 4. Impaired or threatened for one or more designated uses but does not require the development of a TMDL.

4A. TMDL has been completed.

4B. Other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.

4C. Impairment is not caused by a pollutant.

Sublist 5. The water quality standard is not attained. The waterway is impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL. This sublist constitutes the Section 303(d) list of waters impaired or threatened by a pollutant(s) for which one or more TMDL(s) are needed. This sublist constitutes New Jersey's 303(d) List.

Note that **sublists 1 and 2 have been combined** in New Jersey's Integrated List. Sublist 2 is no longer applicable since the Integrated List includes the status of all parameters and their sites.

The **New Jersey's Integrated Report Package is comprised of five components**:

- A front-end report entitled *New Jersey 2002 Integrated Water Quality Monitoring and Assessment Report,* summarizing the contents of the integrated list as it applies to designated use attainment statewide within New Jersey.
- The Integrated List, comprised of sublists 1-5 and priority ranking (Appendix II).
- A document entitled *Integrated Water Quality Monitoring and Assessment Methods* (Methods Document), detailing DEP's assessment methods as applied to the Integrated List.
- A *Comparison Document* indicating where waters previously listed on the 1998 303(d) List currently are listed within the 2002 Integrated List.
- A *Response to Comments Document* containing all DEP responses to public and EPA comments on the Methods Document and Integrated List as mandated by the public process.

PART II

New Jersey is the fifth smallest state in the nation and contains a wide variety of land use types, water resources, geologic characteristics, and natural biota and fauna. Within the state's 7,788 square miles are:

- 7,840 miles of rivers and streams including 6,330 miles of non-tidal rivers and 1,510 miles of tidal rivers;
- 109 square miles (69,920 acres) of lakes and ponds larger than 2 acres;
- 1,061 square miles of estuarine and ocean waters and;
- 1,482 square miles of fresh and saline marshes and wetlands

PART III

Chapter 1: Spatial Extent and Comprehensive Assessment

The U.S. Environmental Protection Agency (EPA) guidance (USEPA, 2002) recommends that each assessment of sampled data be applied to a waterbody with a specific spatial extent (e.g., stream miles, lake, estuary and ocean acres). NJDEP revised and improved its assessment methods in 2002 which included the development of a new method to determine spatial extent of the monitoring networks. Spatial extent is associating a single sampling point to a waterbody such as river stretches and applying the assessment results to this waterbody. The goal in developing the new spatial extent approach was to improve estimates of assigning waterbodies to monitoring stations by maximizing the use of monitoring data without overestimating spatial extent. The results of the spatial extent method is the following comprehensive assessment of the state's waterbodies based upon water quality data collected between 1996 and 2000.

- A total of 3,625 non-tidal river miles were assessed accounting for 55% of the total non-tidal river miles in the state.
- In tidal areas, 1,165 river miles were assessed accounting for 77% of tidal rivers, and 100% of estuaries, bays, and ocean waters were assessed for at least one designated use.
- In contrast to other waterbody types, limited progress has been made in the comprehensive assessment of lakes. Only 371 of 3,278 lakes larger than 2 acres were assessed.

Chapter 2: Conventional Water Quality

There are 7,840 miles of rivers and streams in addition to 675 miles of canals in New Jersey. New Jersey's rivers are used for multiple purposes such as water supplies for drinking water, industry and agriculture, trout and warm-water fisheries, aquatic resources, recreation (e.g., boating, swimming), and wastewater disposal.

Non-Tidal Rivers

- Approximately 430 stations representing 2,308 river miles were assessed using data collected between 1996 and 2000 for at least one of the following parameters; total phosphorus, pH, dissolved oxygen, temperature, fecal coliform, nitrate, total suspended solids, total dissolved solids, unionized ammonia, and metals.
- Of the 2,308 assessed river miles, 1,913 river miles (83%) did not meet the SWQS for at least one parameter. The conventional parameters of most concern in the state are fecal coliform, total phosphorus, pH and metals. The Department has selected fecal coliform, which comprises over 35% of all conventional exceedances, as a priority for TMDL implementation.
- A total of 85 individual conventional listings from 103 sampling sites were delisted from the 1998 303(d) List after new data confirmed that conditions met the SWQS. This represents 28% of the conventional listings on the 1998 303(d) List. 149 listings were re-assessed and found to continue to have exceedances of the standards, and 63 listings were carried over from the 1998 303(d) List due to no new data available or insufficient data to make a new assessment.
- Overall results indicate that dissolved oxygen levels in the state are relatively healthy. The assessment of newer data shows that only 3 of 238 sites (1%) are not attaining dissolved oxygen criteria. This represents only 44 river miles not attaining standards for dissolved oxygen in the state.
- Temperature results indicate 87% of the sites fully attain standards and 13% of the sites exceed the standards. All sites with exceedances for temperature were either trout production or trout maintenance waters, whereas streams classified as non trout or Pineland waters fully attained standards for temperature throughout the state.
- Prior to upgrades and regionalization of sewage treatment plants, ammonia exceedences were common in streams receiving effluent. Since then, the improvement of unionized ammonia concentrations in water quality statewide has been dramatic. Of the 241 stations assessed, all are fully attaining the SWQS criteria. The only two stations on sublist 5 were carried over from the 1998 303(d) List due to no new data collected at these sites.
- A total of 257 stations representing 2,179 river miles were assessed for total phosphorus. The average TP for all sites was 0.1 mg/l. The assessment results show that almost half of the stations do not meet TP standards (45% non attaining, 55% attaining).
- Observations revealed that 20 stations with low pH exceedances were located in areas directly surrounding the Pinelands yet are classified as FW-2 and not PL waters within the SWQS. These areas are characterized as having environmental conditions such as soils, geology, and vegetation very similar to the Pinelands, therefore, there is speculation that the low pH at these sampling sites may be attributable to natural conditions. Further approaches should be studied to determine if a change to the SWQS for pH to reflect natural conditions will be developed for the waterways surrounding the Pinelands.

- For total suspended solids (TSS), fully attaining sites comprise over 94% of the assessed sites, while only 6% exceed the standards for TSS. TSS exceedances most commonly occur during high flows when erosion of streambanks and soils in runoff contribute to elevated TSS levels. This is evident at the 10 sites exceeding TSS criteria experiencing a majority of their exceedances during high flows. Consequently, stations with very little high flow data available may be masking their TSS exceedances.
- Over 98% of the stations fully met the standards for TDS.
- As a result of new data collection, a total of 142 individual metal were delisted from the 1998 303(d) List after new data confirmed that conditions met the SWQS. This represents 43% of the metal listings on the 1998 303(d) List. Thirty-five metal listings were found to continue to have exceedances of metal standards, and 152 listing were carried over from the 1998 303(d) List due to no new data available or data was insufficient to make a new assessment.

Tidal Rivers and Coastal Waters

- Seventeen sites representing 179 river miles were assessed for metals in tidal rivers. Of the 91 individual metal listings on the 1998 303(d) List, 40 metals (44%) were delisted from the 17 assessed sites. Aside from these delistings, all 179 river miles still had at least one metal on sublist 5.
- Of the 1,061 square miles of coastal waters (estuary and ocean), only 68 square miles were assessed for metals; i.e. waters contained within the NY-NJ Harbor and Toms River Estuary. The harbor, with the exception of Raritan Bay, met standards for metals except for mercury (Raritan Bay, met all criteria). For other toxic substances including PCB, dioxin, PAH, and pesticides, the Harbor waters (including Raritan Bay) continued to be listed on sublist 5. Toms River Estuary did not have sufficient data to update its metal assessments.

Chapter 3: Designated Use Assessment

Rivers (non-tidal)

- Approximately 2,063 river miles represented by 271 monitoring stations were assessed for recreational designated use attainment. Only 22% of the assessed sites were fully attaining and 78% did not meet the standards for recreational activity.
- All current drinking supply waters fully meet designated uses, while over 98% of the other waters (i.e. waters designated for water supply but not in current use for this purpose) meet criteria for nitrate, which was used as an indicator for drinking water designated uses.
- All waters meet the designated use for agriculture.
- Although 27% of the sites exhibit water quality violations for pH and or total suspended solids, both being indicators for industrial designated uses, there are no areas in the state where a water supply is confirmed to be unsuitable for industrial use.

NJDEP evaluated aquatic life designated use support in non-tidal rivers and streams using benthic macroinvertebrates between 1997 and 2001. New Jersey assessed 921 locations statewide for the 2002 Integrated List. Results are as follows.

- A subtotal of 348 benthic macroinvertebrate sites were placed on sublist 3 based upon protocols developed by an Interagency Workgroup because they were deemed to be unique sites requiring additional or alternative assessment.

- Out of the remaining 573 stations sampled statewide during the most recent sampling (1997-2001); 223 stations were rated as non-impaired and listed on sublist 1, 348 stations were rated as in nonsupport of the designated use and assigned to sublist 5. Of this total on sublist 5; (76 stations) were assessed as severely impaired and 242 were assessed as moderately impaired.
- When translated into river miles the results are as follows: of a total of 2462 miles assessed; 683 miles (28%) fully support the use, 964 miles (39%) represent insufficient data (sublist 3) and 815 miles (33%) do not support the use (sublist 5).

Evaluating the second round data against the first round assessments would be difficult due the large number of sites which have been assigned to Sublist 3 (insufficient data) in the 2002 Integrated List. In a sense the 1998 network and the network as assessed here are very different monitoring networks. The best comparison would be to enumerate the number of sites listed in the New Jersey 1998 303(d) list which have been delisted and moved to Sublist 1 (sites now in full attainment). Of a total of 590 AMNET sites originally listed in 1998, sixty-nine were assessed in 2002 as fully supporting the use and delisted (moved to Sublist 1) (see Table 3.1a-2). Two hundred and fifty-six sites are still assessed as being in non-support and remain on Sublist 5 of the 2002 List.

Of significance are 235 sites present on the 1998 303(d) List assessed in 2002 as being in need of additional evaluation (sublist 3) due to their locations in relation to the Pinelands or headwater locations, etc. These sites were delisted from sublist 5 (the 303(d) list) and will need to be reassessed using methods calibrated for the special conditions represented by these locations. Also, 26 sites listed on the 1998 List were found to be located at or beyond the head of tide and are not assessed in 2002 as the current assessment methods are inappropriate for tidal conditions. These locations are also delisted from sublist 5 (the 303(d) list) and are regarded as "unassessed." Four sites from the 1998 List could not be located in the AMNET database and are believed to represent transcription errors in the 1998 List.

Research by the USGS in New Jersey has indicated that hydrologic instability, substrate quality, the density and percent of impervious surface cover in the upstream watershed and total annual flow of municipal effluent were important factors that contribute to benthic impairment.

Tidal Rivers

Of the 95 miles of tidal rivers assessed for support of Aquatic Life Use support using dissolved oxygen measurements, 76 miles (80%) were assessed to be in full attainment, 19 miles were in non attainment (20%). Areas of non-support included tidal portions of the Shark River and Jumping Brook, tidal Patcong Creek and the Middle River within the Great Egg Harbor River watershed, and the lower tidal portions of the Maurice River.

Of the 97 miles of tidal rivers assessed for support of recreational uses based upon sanitary quality, 53 miles (55%) were assessed to be in full attainment, 44 miles were in non attainment (45%). Areas of non-support included Matawan, Waackaack, Chingarora and Luppatatong Creeks, all tributaries to the Raritan Bay; and the lower Maurice River.

Lakes

There are approximately 3,278 lakes, reservoirs and ponds over 2 acres in New Jersey, but of these, only about 60 are natural. The remainder are constructed impoundments. There are 380 public lakes (24,000 acres) and 64 reservoirs. Uses of New Jersey's lakes, reservoirs, and ponds vary and can include potable water supply, water storage, recreational boating, fishing and swimming. These waterbodies also provide habitat for a variety of aquatic life and wildlife.

The **aquatic life use support assessment for lakes** was based upon warm water fishery assessments supplied by the Department's Bureau of Freshwater Fisheries. Of the 40 lakes described by Fish and Wildlife totaling 11,861 acres; 34 lakes fully support the use, one lake is fully supporting but threatened, 4 lakes partially support the use and one lake does not support the use.

Lake bathing beaches are monitored for sanitary quality by county and local health departments with oversight and program coordination from New Jersey Department of Health and Senior Services (NJDHSS). NJDEP's Cooperative Coastal Monitoring Program compiles NJDHSS data so that a more comprehensive picture of the quality of all NJ bathing beaches can be provided.

Lakes Recreational Designated Use Assessment Results are as follows. Of a total of 271 lakes assessed and reported to the NJDHSS, 197 (73%) lakes provided bathing beaches of excellent recreational swimming quality (full attainment of the use). Seventy-two lakes (26%) showed non-attainment of the primary contact use based upon the sanitary quality of their bathing beaches. Two lakes (1%) were listed on Sublist 3 due to insufficient data needed to make an assessment (beach was either closed or data were not provided). Results for individual lakes are provided in Integrated List Tables.

Of 117 public lakes assessed by the Clean Lakes Program for **trophic status**, 115 are located on the Department's GIS system. Of these 115 lakes, 4 lakes (249 acres) were assessed as mesotrophic and assigned to sublist 1 (fully supporting uses). The remaining 111 lakes were assessed as eutrophic. Of these, 61 are assigned to sublist 3 (insufficient data) because their use support status is unclear, 3 are on sublist 4 because they have had TMDLs completed, and the remaining 47 are on sublist 5 (TMDL List) because of a nonsupport of recreational uses due to excessive algae.

Many of the lakes in New Jersey are constructed impoundments which are highly prone to **eutrophication**. Eutrophication occurs naturally as lakes age, however, this process can be accelerated from excessive inputs of nutrients and suspended sediments from the surrounding watersheds. Eutrophic lakes are characterized by excessive growth of aquatic weeds and algae, shallow depths as sediments fill the lake in, elevated temperatures, and low dissolved oxygen. The excessive algal growth, be it planktonic or rooted, often create aesthetically unpleasant conditions for swimming and difficult conditions for boating.

Estuary and Coastal Waters

The Department currently assesses the condition of the coastal marine biota to assess the Aquatic Life Designated Use in these waters by indirect methods, that is, by using dissolved oxygen (DO) measurements. Of the 258 square miles of **open estuarine waters** assessed from southern Raritan Bay south to Cape May, 67% had sufficient dissolved oxygen levels to support a healthy biota. The remaining 33% were assessed as being in non attainment due to periodic drops in DO levels to unacceptable levels. Locations where DO violations were observed centered around the Shark and Lower Manasquan Rivers, Great Bay, Absecon and Lakes Bay, Sculls Bay, and Great Egg Harbor Inlet.

Factors contributing to low dissolved oxygen concentrations in New Jersey estuaries are both natural and anthropogenic. Estuarine DO levels are characteristically lowest in summer, when water is warm and biological activity is at its highest. Many of the estuaries along the New Jersey coast are shallow waterbodies, often with poor mixing which contributes to the warming of the waters in summer that in turn contribute to low oxygen levels. An additional contributing factor to low DO is input of naturally oxygen depleted waters from adjacent wetlands especially during ebb tides.

Of 454 square miles of **ocean** water assessed (Sandy Hook south to Cape May and 3 nautical miles off the coast) 30 percent (136 sq. mi.) fully support (Sublist 1) the Aquatic Life Use and the remaining 70 percent (318 sq. mi.) are in nonattainment (Sublist 5) due to a benthic low DO cell which forms off the coast during the summer months and breaks up in the fall. The areas of full support are centered approximately one mile off the coast from Barnegat Inlet, Absecon Inlet and a three mile eastward transect just above Hereford Inlet.

It is important to note that the biological impacts on the ocean floor are not known: DO concentrations provide a surrogate indicator of aquatic life designated use attainment and do not provide an assessment of actual biological conditions. In open waters, fish can avoid areas with low DO, and many crustaceans and other benthic inhabitants are naturally tolerant of temporary low DO conditions. The Department does not have data to characterize the status of the benthic community in these waters, therefore, the significance of temporary DO conditions below 5 mg/l to aquatic life uses is unclear.

Occurrences of low DO in the ocean have been attributed to a combination of natural processes and anthropogenic inputs of nutrients. Ocean waters naturally stratify as they warm in the summer. As phytoplankton bloom and die during the summer, natural biological activity decomposes the algae which in turn reduces DO levels near the ocean floor.

The National Shellfish Sanitation Program (NSSP) collects data on the levels of total coliform in shellfish and **waters that are harvested for shellfish**. The Department monitors the sanitary quality of estuarine and ocean waters by observing measurements of coliform bacterial concentrations (indicators of the presence of pathogens) in the water column and uses the results to classify bay, estuarine and ocean waters for shellfish harvesting. The data are analyzed for compliance with federal standards.

New Jersey has been a national leader in maintaining and enhancing waters available for shellfish harvest. The shellfish waters that support harvesting have increased from 75% in 1977, to 87% in 1998 and 88% in 2000.

In estuarine waters; marinas, boating, urban runoff and stormwater were identified as major contributing factors impacting on shellfish. In Offshore/Ocean waters, direct discharges from ocean outfalls may present localized impacts and nonpoint source/urban runoff continues to have a negative impact.

The Barnegat Bay – Little Egg Harbor Estuary, long recognized for its outstanding aesthetic, economic, and recreational value, is now affected by an array of human impacts that potentially threaten its ecological integrity. The development accompanying the increasing population growth has resulted in land use changing from principally undeveloped and agricultural to suburban. The magnitude and intensity of different land uses in the Barnegat Bay watershed are having significant, and often degrading effects. Development also impacts the estuary's fisheries and other biological resources through nonpoint source pollution and habitat loss.

Planktonic single celled algae are abundant in the coastal waters of New Jersey. Concerns are sometimes raised when populations of some algal species grow very quickly and undergo a "bloom". **Of the many forms of alga**e present in New Jersey waters, **two are currently of concern to the Department** due to their potential to harm local fish, shellfish and sea grass populations; one is *Aureococcus anophagefferens, a* minute brown alga, which is responsible for "brown tide blooms" that may be ecologically harmful but not harmful to human health. The other is the non-photosynthetic dinoflagellate *Pfiesteria*, which has negative impacts to fish health.

Chapter 4

Fish Consumption Advisories

Important commercial and recreational species can be safely eaten by anyone, including summer and winter flounder, weakfish, smallmouth bass, perch, carp, etc. For other species, New Jersey along with many other states have developed fish consumption advisories that apply to specific species, generally in specific areas. Fish consumption advisories generally limit frequency of consumption.

The Department has issued statewide advisories for American eel, bluefish, striped bass, and American lobster for PCB contamination. Additional advisories in certain areas have been issued for white perch and white catfish for PCBs and blue crabs and shellfish for PCBs and/or dioxin. Table 4.1.1 lists the additional advisories for specific waterbodies. The Department has also issued mercury advisories in freshwater for largemouth bass and chain pickerel. The exceptions include, but are not limited to: Assunpink Creek, Big Timber Creek, Lake Hopatcong, and Cranberry Lake. The complete list of exceptions to this advisory are noted in Table 4.1.2.

The Department convened its first **Mercury Task Force** in 1993 that recommended stringent reductions in mercury emissions from municipal solid waste incinerators. These were subsequently implemented by NJDEP and resulted in a 90 percent reduction from this source

category. The Department subsequently convened a second Mercury Task Force in 1998 triggered by a concern that additional significant sources of environmental mercury still existed, and that energy deregulation could increase the mercury emissions from Midwestern power plants potentially resulting in increased mercury deposition in New Jersey.

The task force report indicates that air deposition (wet and dry) is the most significant source of environmental mercury followed by water born sources such as point source discharges of wastewater, nonpoint sources such as septic tank leachate, and sludge application.

The 1998 Task Force reviewed all local and regional mercury sources and advocated a long range goal of the virtual elimination of anthropogenic sources of mercury through a range of recommendations, both enforceable and voluntary. New Jersey expects the implementation of these recommendations will make large contributions to reducing mercury uses and emissions and this will in turn lead to reductions in mercury body burdens in fish.

New Jersey has placed waters with mercury-based fish advisories on sublist 5 with a low priority ranking. The Department will wait for an EPA-sponsored national mercury policy before reconsidering its listing policy regarding mercury advisories and their placement on the Integrated List.

New York/New Jersey Harbor Estuary

Overall, the harbor water quality from 1991 through 2001 has significantly improved from pre-1990 conditions. This is the result of:

- construction and upgrading of water pollution control plants;
- increased maintenance of the sewage system (including over 6,000 miles of sewer main);
- increased management of combined sewer overflows;
- the ongoing abatement of illegal discharges; and,
- an enhanced Industrial Pretreatment Program that controls commercial discharges by requiring targeted industries to treat and remove toxics from their wastewater.

The harbor area is primarily designated for secondary contact recreation (activities including boating and fishing where the probability of ingestion is minimal). In consideration of the recent data, the Department has delisted the harbor waters for fecal coliform, dissolved oxygen, and metals with the exception of mercury.